

## Domino Chain Reactions

Fission of uranium-235 is a process that relies on neutrons. When a uranium-235 nucleus splits into two smaller nuclei, it releases two or three neutrons that can cause neighboring nuclei to undergo fission. This fission can result in a nuclear chain reaction. In this lab, you will build two models of nuclear chain reactions, using dominoes.

### OBJECTIVES

Build models to represent controlled and uncontrolled nuclear chain reactions.  
Compare models of controlled and uncontrolled nuclear chain reactions.

### MATERIALS

- dominoes (15)
- stopwatch

### PROCEDURE

1. For the first model, set up the dominoes as shown in your book. When pushed over, each domino should hit two dominoes in the next row.
2. Measure the time it takes for all the dominoes to fall. To do this, start the stopwatch as you tip over the front domino. Stop the stopwatch when the last domino falls. Record this time.  
  
\_\_\_\_\_  
  
\_\_\_\_\_
3. If some of the dominoes do not fall, repeat steps 1 and 2. You may have to adjust the setup a few times.
4. For the second model, set up the dominoes as shown in your book. The domino in the first row should hit both of the dominoes in the second row. Beginning with the second row, only one domino from each row should hit both of the dominoes in the next row.
5. Repeat step 2. Again, you may have to adjust the setup a few times to get all the dominoes to fall.

**Domino Chain Reactions** *continued***ANALYZE THE RESULTS**

- 1. Classifying** Which model represents an uncontrolled chain reaction? Which represents a controlled chain reaction? Explain your answers.

---

---

---

---

---

- 2. Analyzing Results** Imagine that each domino releases a certain amount of energy as it falls. Compare the total amount of energy released in the two models.

---

---

---

- 3. Analyzing Data** Compare the time needed to release the energy in the models. Which model took longer to release its energy?

---

---

---

**DRAW CONCLUSIONS**

- 4. Evaluating Models** In a nuclear power plant, a chain reaction is controlled by using a material that absorbs neutrons. Only enough neutrons to continue the chain reaction are allowed to continue splitting uranium-235 nuclei. Explain how your model of a controlled nuclear chain reaction modeled this process.

---

---

---

---

---